

Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2001

Ecological Studies of the Kenai Peninsula Brown Bear

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Annual Research Performance Report
1 July 2000–30 June 2001
Federal Aid in Wildlife Restoration
Grant W-27-4, Study 4.29

This is a progress report on continuing research. Information may be refined at a later date.

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FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
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PROJECT TITLE: Ecological studies of the Kenai Peninsula brown bear

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COOPERATORS: Kenai National Wildlife Refuge, United States Fish and Wildlife Service, U.S. Dept. of Interior; Chugach National Forest, U. S. Forest Service, U.S. Department of Agriculture; Kenai Fjords National Park, National Park Service, U.S. Department of Interior

GRANT AND SEGMENT NR.: W-27-4

PROJECT NR.: 4.29

SEGMENT PERIOD: 1 July 2000–30 June 2001

WORK LOCATION: Kenai Peninsula

STATE: Alaska

I. PROGRESS ON PROJECT OBJECTIVES Assess survivorship and recruitment to evaluate perceived population trends seen in recapture data. *Over the course of this project we have captured and monitored over 50 female bears on the Kenai Peninsula, not including their offspring. From these data, we calculated survivorships of 0.9032 (CI = 0.799-1.007; n = 31), 0.6 (CI = 0.352-0.846; n = 15), and 0.667 (CI=0.428-0.905; n = 15) for adult females, Cubs of the Year (COY), and Yearlings, respectively. Additional data will be collected each year during telemetry tracking sessions.*

1. Determine if Kenai brown bears represent a population exhibiting large litter sizes and early weaning. *Previous work has shown the Kenai Peninsula brown bear population has COY litters which average 2.36 ± 0.67 cubs (n = 56), Yearling litters which on average contain 2.06 ± 0.65 (n = 51) animals, and even litters of two-year olds (2.04 ± 0.68 individuals; n = 25). The mean interval between litters is 3.5 ± 0.6 years (n = 13).*
2. Measure the degree of heterozygosity seen in the Kenai brown bears, and calculate an “effective population size” (N_e) *Blood samples from over 80 different Kenai Peninsula brown bears were sent to the USGS/BRD genetics laboratory in Anchorage. DNA extraction, PCR amplification, and sequencing were conducted during the winter. A draft progress report is available for review from SDF.*
3. Assess habitat use, identify key travel corridors, and quantify the nutritional resource needs of adult male brown bears. *A total of 5 adult males have been handled to date. Technical difficulties with collaring such large animals remain.*

4. Experimentally evaluate if the management concept of “buffers” has biological relevance to Kenai brown bears. *No work has been accomplished on this objective.*
5. Continue to evaluate and refine the cumulative effects model *The vegetation map of the Kenai Peninsula has become available and will be used in the test of the cumulative effects model.*
6. Develop and apply new technologies (e.g., video collars, triaxial accelerometers) to ecological studies of bears. *Plans have been drafted for different collar types, and a field test was conducted for Timed Data Recorder (TDR) use.*
7. Determine if the geographic range of Kenai Peninsula brown bears extends into Prince William Sound. *No work was conducted on this objective this year.*
- 9.. Continue publication and report writing. Multiple public presentations and two posters were completed this year.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

D. JOBS (related Objectives indicated in parentheses)

1. Assess population trend from additional data on population age structure, adult and offspring survival, and offspring recruitment. Information will be collected in the course of radio-collaring across the peninsula (1,2) *A total of 22 tracking flights were conducted this year, resulting in 245 radiorelocations. Data on cub production, survivability, and litter sizes were collected and analyses are continuing.*
2. Use biological samples (blood and tissue) collected from radio-collared and sealed bears for mitochondrial and microsatellite analyses (3) *Archived samples from brown bear capture work extending from the early 1990s to 1999 were sent out for laboratory analyses. Very preliminary findings indicate Kenai Peninsula brown bears do not exhibit a degree of heterozygosity different than other Alaskan brown bear populations. This may result from highly restricted recruitment, or a founder effect.*
3. Specifically capture adult male brown bears for radiocollaring and biological sample collection. Employ new technology (remote release Global Positioning System (GPS), video, and tri-axial accelerometer collars, stable isotope and fatty acid signatures, and total body water dilution to better assess the nutritional ecology (e.g. seasonal diet and changes in body composition) of adult male brown bears (1,3,4,7). *The collaring of large adult male brown bears continues to be fraught with difficulty. One bear wore its collar for 2 months, but the collar malfunctioned and recorded no data. A second male dropped his collar soon after recovery from darting, and a third animal disappeared.*
4. Conduct snaring in areas critical to management, but impossible to work by air (5). *Snaring was conducted during mid-July. Two adult females were captured, collared, and released. A third bear was captured but escaped from the snare.*

5. Develop algorithms to simulate the assumed biological basis of "buffers", utilizing extensive location data collected by GPS collars. Attempt to conduct controlled field experiment to test assumptions, using radio-collar animals in areas with known timber (5). *No work was accomplished on this job this year.*
6. Continue to map brown bear locations collected via aerial telemetry and GPS collars for identification of habitat use, peninsula-wide species range, and discrete travel corridors (6). A total of 15 bears were handled (helicopter darting and snaring) for a total of 23 captures. Eight bears (females) successfully wore GPS-SOB collars from mid July until late fall, and the collars recorded a total of 23,278 locations ($2,922 \pm 401$). *We are collaborating with other bear researchers who are developing analytical approaches to determining travel corridors from location data.*
7. Incorporate the soon-to-be-released Peninsula vegetation map for testing and refinement of the cumulative effects model (6). *The vegetation map has been incorporated into a resource selection function map that will identify probabilities of landscape use by brown bears.*
8. Collect scat samples from select salmon streams on the Peninsula's east coast; use DNA-based techniques to determine if the samples are black or brown bear in origin (8). *No more samples have been collected from the field.*
9. Preparation of reports and technical publications (9). *The conservation assessment was completed, undergone review, and is being prepared for publication. Two posters were constructed for presentation (one at a national meeting) and more than 5 public talks were given, both inside Alaska and outside.*

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD: *There was none.*

IV. FEDERAL AID TOTAL PROJECT COSTS FOR THIS SEGMENT PERIOD
\$111,300.00

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APPROVAL DATE: _____